

Claims

1. A membrane electrode unit for direct methanol fuel cells, comprising an anode gas diffusion substrate, an anode catalyst layer, an ionomer membrane, a cathode catalyst layer and a cathode gas diffusion substrate, wherein the anode catalyst layer is applied to the anode gas diffusion substrate, and the cathode catalyst layer is present directly on the ionomer membrane.
2. The membrane electrode unit as claimed in claim 1, wherein the anode catalyst layer is applied both to the anode gas diffusion substrate and to the ionomer membrane, and the cathode catalyst layer is present directly on the membrane.
3. The membrane electrode unit as claimed in claim 1, wherein the layer thickness of the anode catalyst layer is between 20 and 200 micron and the layer thickness of the cathode catalyst layer is between 5 and 50 micron.
4. The membrane electrode unit as claimed in claim 1, wherein the precious metal loading of the anode layer is between 0.25 and 6 mg of precious metal/cm² and the precious metal loading of the cathode layer is between 0.1 and 2.5 mg of precious metal/cm².
5. The membrane electrode unit as claimed in claim 1, wherein supported or unsupported bi-metallic platinum/ruthenium catalysts are used as anode catalyst.
6. The membrane electrode unit as claimed in claim 1, wherein supported or unsupported platinum-containing catalysts are used as cathode catalyst.

7. A method for the production of a membrane electrode unit for direct methanol fuel cells, comprising the coating of an anode gas diffusion substrate with anode catalyst ink,
5 the drying of the coated anode gas diffusion substrate,
the coating of an ionomer membrane on one side with cathode catalyst ink,
the drying of the ionomer membrane coated on one side
10 and
the uniting of the coated anode gas diffusion substrate with the ionomer membrane coated on one side and the cathode gas diffusion substrate.
8. The method as claimed in claim 7, furthermore
15 comprising the washing of the catalyst-coated gas diffusion substrates or ionomer membranes with water.
9. The use of the membrane electrode units as claimed in claim 1 for the production of direct methanol fuel cells for operation with liquid methanol/water
20 mixtures at temperatures between 20 and 90°C.